CLAIMS

1-29. (canceled)

30. (new) A method for processing signals in a transmission system having a transmitter subsystem connected to a receiver subsystem by an electrical backplane, wherein the electrical backplane receives a transmitted data signal from the transmitter subsystem and provides a received data signal to the receiver subsystem, the method comprising:

in the transmitter subsystem:

providing a final binary data signal; and

processing the final binary data signal to provide the transmitted data signal to the electrical backplane; and

in the receiver subsystem:

receiving the received data signal from the electrical backplane; and

processing the received data signal as a duobinary data signal, wherein:

the transmission system comprises at least one filter located in at least one of the transmitter subsystem and the receiver subsystem;

the transfer function property of the combination of the electrical backplane and the at least one filter corresponds to the transfer function property of a binary-to-duobinary converter; and

after providing the final binary data signal, no duobinary data signal exists in the transmitter subsystem.

31. (new) The invention of claim 30, wherein the final binary data signal is a precoded binary data signal.

32. (new) The invention of claim 30, further comprising filtering using the at least one filter after providing the final binary data signal and prior to processing the received data signal as the duobinary data signal.

33. (new) The invention of claim 32, wherein:

the at least one filter is located in the transmitter subsystem; and

in the transmitter subsystem, the processing comprises filtering the final binary data signal using the at least one filter.

34. (new) The invention of claim 32, wherein the filtering comprises equalizing filtering.

35. (new) The invention of claim 32, wherein the filtering is designed to emphasize high-frequency components and flatten group delay of the electrical backplane.

36. (new) The invention of claim 32, wherein the filtering is implemented using an FIR filter.

37. (new) The invention of claim 32, wherein the filtering:

delays a first copy of the filtered data signal;

attenuates the delayed first copy; and

adds the attenuated, delayed first copy to a second copy of the filtered data signal.

38. (new) The invention of claim 32, wherein the combination of the filtering and the transmission through the electrical backplane approximates binary-to-duobinary conversion.

39. (new) The invention of claim 30, wherein duobinary-to-binary (D/B) conversion is applied to the received data signal to generate an output binary data signal.

40. (new) The invention of claim 39, wherein the D/B conversion comprises:

comparing amplitude of the received data signal with first and second threshold voltages to generate first and second binary streams; and

applying a logic function to the first and second binary streams to generate the output binary data signal.

41. (new) The invention of claim 40, wherein the logic function comprises an exclusive-OR (XOR) function.

42. (new) The invention of claim 40, wherein the logic function comprises an exclusive-NOR (XNOR) function.

43. (new) The invention of claim 40, wherein:

the output binary data signal is an NRZ binary data signal; and

the first and second threshold voltages are selected such that one of the first and second binary streams is always zero or always one.

44. (new) The invention of claim 30, wherein the electrical backplane comprises a multi-layer board.

45. (new) The invention of claim 30, wherein:

the final binary data signal is a precoded binary data signal;

filtering is performed using the at least one filter after providing the final binary data signal and prior to processing the received data signal as the duobinary data signal; and

duobinary-to-binary (D/B) conversion is applied to the received data signal to generate an output binary data signal.

46. (new) The invention of claim 45, wherein:

the combination of the filtering and the transmission through the electrical backplane approximates binary-to-duobinary conversion; and

the duobinary-to-binary conversion comprises:

comparing amplitude of the received data signal with first and second threshold voltages to generate first and second binary streams; and

applying a logic function to the first and second binary streams to generate the output binary data signal.

47. (new) A transmission system comprising:

a transmitter subsystem; and

a receiver subsystem connected to the transmitter subsystem by an electrical backplane, wherein the electrical backplane receives a transmitted data signal from the transmitter subsystem and provides a received data signal to the receiver subsystem, wherein:

the transmitter subsystem is adapted to:

provide a final binary data signal; and

process the final binary data signal to provide the transmitted data signal to the electrical backplane; and

the receiver subsystem is adapted to:

receive the received data signal from the electrical backplane; and

process the received data signal as a duobinary data signal, wherein:

the transmission system comprises at least one filter located in at least one of the transmitter subsystem and the receiver subsystem;

the transfer function property of the combination of the electrical backplane and the at least one filter corresponds to the transfer function property of a binary-to-duobinary converter; and

after providing the final binary data signal, no duobinary data signal exists in the transmitter subsystem.

48. (new) The invention of claim 47, wherein the at least one filter is adapted to filter after the final binary data signal is provided and prior to the received data signal being processed as the duobinary data signal.

49. (new) The invention of claim 48, wherein the at least one filter is designed to emphasize high-frequency components and flatten group delay of the electrical backplane.

50. (new) The invention of claim 48, wherein the at least one filter comprises:

one or more delays adapted to delay a first copy of the filtered data signal;

an attenuator adapted to attenuate the delayed first copy; and

a summing node adapted to add the attenuated, delayed first copy to a second copy of the filtered data signal.

51. (new) The invention of claim 50, wherein the at least one filter further comprises a selector connected to receive an output from each of a plurality of delays and adapted to select one of the delay outputs as the signal applied to the attenuator.

52. (new) The invention of claim 48, wherein the combination of the at least one filter and the electrical backplane approximates a binary-to-duobinary converter.

53. (new) The invention of claim 47, wherein the receiver subsystem comprises a duobinary-to-binary (D/B) converter adapted to apply duobinary-to-binary conversion to the received data signal to generate an output binary data signal.

54. (new) The invention of claim 53, wherein the D/B converter comprises:

a splitter adapted to split the received data signal;

two comparators, each adapted to compare a copy of the received data signal to a specified threshold voltage; and

a logic gate adapted to generate the output binary data signal from outputs from the two comparators.

55. (new) The invention of claim 54, wherein:

the output binary data signal is an NRZ binary data signal; and

the threshold voltages for the two comparators are selected such that one of the comparator outputs is always zero or always one.

56. (new) The invention of claim 47, wherein:

the transmitter subsystem comprises a precoder adapted to provide the final binary data signal as a precoded binary data signal;

the at least one filter is adapted to perform filtering after the final binary data signal is provided and prior to the received data signal being processed as the duobinary data signal; and

the receiver subsystem comprises a duobinary-to-binary converter adapted to apply duobinary-to-binary conversion to the received data signal to generate an output binary data signal.

57. (new) The invention of claim 56, wherein:

the combination of the at least one filter and the electrical backplane approximates a binary-to-duobinary converter; and

the duobinary-to-binary converter comprises:

a splitter adapted to split the received data signal;

two comparators, each adapted to compare a copy of the received data signal to a specified threshold voltage; and

a logic gate adapted to generate the output binary data signal from outputs from the two comparators.

58. (new) Apparatus for processing signals in a transmission system having a transmitter subsystem connected to a receiver subsystem by an electrical backplane, wherein the electrical backplane receives a transmitted data signal from the transmitter subsystem and provides a received data signal to the receiver subsystem, the apparatus comprising:

in the transmitter subsystem:

means for providing a final binary data signal; and

means for processing the final binary data signal to provide the transmitted data signal to the electrical backplane; and

in the receiver subsystem:

means for receiving the received data signal from the electrical backplane; and

means for processing the received data signal as a duobinary data signal, wherein:

the transmission system comprises at least one filter located in at least one of the transmitter subsystem and the receiver subsystem;

the transfer function property of the combination of the electrical backplane and the at least one filter corresponds to the transfer function property of a binary-to-duobinary converter; and

after providing the final binary data signal, no duobinary data signal exists in the transmitter subsystem.